

Claims

1. A protein or polypeptide which is present in nucleus of human or animal cell and which has a transcription factor
5 function and/or a function that can induce expression of retinoblastoma gene (RB1 gene) or a gene product thereof.

2. The human protein according to claim 1, which is a polypeptide or protein selected from a group consisting of:
10 (1) a polypeptide or protein represented by an amino acid sequence set forth in SEQ ID No: 1 in the sequence listing;
(2) a polypeptide containing an amino acid sequence comprising at least five amino acids of the amino acid sequence of the polypeptide or protein; (3) a polypeptide
15 or protein having homology of at least approximately 70% at the amino acid sequence level with the polypeptide or protein; and (4) a protein or polypeptide having a mutation or induced mutation such as a deletion, substitution or addition of one to several amino acids relative to the amino
20 acid sequence of the polypeptide or protein according to any one of the preceding (1) to (3).

3. The animal protein according to claim 1 that is a protein derived from mouse, and which is a polypeptide or protein
25 selected from the group consisting of: (1) a polypeptide or protein represented by an amino acid sequence set forth

in SEQ ID No: 2 in the sequence listing; (2) a polypeptide containing an amino acid sequence comprising at least five amino acids of the amino acid sequence of the polypeptide or protein; (3) a polypeptide or protein having homology
5 of at least approximately 70% at the amino acid sequence level with the polypeptide or protein; and (4) a protein or polypeptide having a mutation or induced mutation such as a deletion, substitution or addition of one to several amino acids relative to the amino acid sequence of the
10 polypeptide or protein according to any one of the preceding (1) to (3).

4. A nucleic acid coding for the polypeptide or protein according to any one of claims 1 to 3, or a complementary
15 strand thereof.

5. A nucleic acid hybridizing under stringent conditions with the nucleic acid according to claim 3 or the complementary strand thereof.

20 6. A nucleic acid represented by a base sequence comprising at least 15 consecutive bases of the base sequence of a nucleic acid set forth in SEQ ID Nos: 3 to 4 in the sequence listing or a complementary strand thereof, wherein a polypeptide
25 expressed by transcription of the nucleic acid is the polypeptide according to any one of claims 1 to 3.

7. A recombinant vector containing the nucleic acid according to any one of claims 4 to 6.

5 8. A transformant that was transformed with the recombinant vector according to claim 7.

9. A method for producing the polypeptide or protein according to any one of claims 1 to 3, comprising a step
10 of culturing the transformant according to claim 8.

10. Nucleic acid primers set forth in SEQ ID Nos: 5 to 132 in the sequence listing, which hybridize under stringent conditions with the nucleic acid according to any one of
15 claims 4 to 6 or the complementary strand thereof.

11. An antibody that immunologically recognizes the polypeptide or protein according to any one of claims 1 to 3.
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12. A method of screening for compounds that inhibit or enhance a function that can induce transcription factor activity and/or expression of RB1 gene of the polypeptide or protein according to any of claims 1 to 3, wherein the
25 method uses at least one member of the group consisting of the polypeptide or protein according to any one of claims

1 to 3 and the antibody according to claim 11.

13. A method of screening for compounds that interact with the nucleic acid according to claim 4 or 6 to inhibit or
5 enhance expression of the nucleic acid, wherein the method uses at least one member of the group consisting of the nucleic acid according to any one claims 4 to 6, the vector according to claim 7, the transformant according to claim 8, and the nucleic acid primers according to claim 10.

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14. A compound that was screened by the screening method according to claim 12 or 13.

15. A compound that inhibits or enhances transcription factor activity and/or a function that can induce expression of RB1 gene of the polypeptide or protein according to any of claims 1 to 3.

16. A compound that interacts with the nucleic acid according to any one of claims 4 to 6 to inhibit or enhance expression
20 of the nucleic acid.

17. A pharmaceutical composition for use in treatment of multidrug resistance that is resistance to treatment with
25 anticancer agents, wherein the pharmaceutical composition comprises at least one member of the group consisting of

the polypeptide or protein according to any of claims 1 to 3, the nucleic acid according to any one of claims 4 to 6, the vector according to claim 7, the transformant according to claim 8, the nucleic acid primers according to claim 10, 5 the antibody according to claim 11, and the compound according to any one of claims 14 to 16.

18. A method of testing and diagnosing a disease related with expression or activity of the polypeptide or protein 10 according to any of claims 1 to 3, wherein the method comprises a step of conducting analysis employing (a) a nucleic acid encoding the polypeptide or protein and/or (b) the polypeptide or protein, as a marker in a sample.

15 19. The method of testing and diagnosing according to claim 18, which is a method of testing cancer cells or a method for diagnosing a cancer.

20 20. The method according to claim 18 or 19 which detects expression, increase, decrease, lack or the like of all or a part of the polypeptide or protein according to any of claims 1 to 3, wherein the method uses the antibody according to claim 11.

25 21. The method according to claim 18 or 19 which detects expression, mutation, lack or insertion or the like of all

or a part of a gene encoding the polypeptide or protein according to any of claims 1 to 3 through a step of amplifying a gene encoding the polypeptide or protein according to any of claims 1 to 3 using at least one of nucleic acid primers
5 according to claim 10.

22. The method according to any of claims 18 to 21, wherein the method combines assay of expression, increase, decrease, mutation, lack or insertion or the like of all or a part
10 of tumor-suppressor gene retinoblastoma gene (RB1 gene) or the gene product thereof (RB1 protein).

23. The method according to any of claims 18 to 22, wherein the method combines assay of expression, increase, decrease,
15 mutation, lack or insertion or the like of all or a part of multidrug resistance gene (MDR1 gene) or the gene product thereof (MDR1 protein: P-glycoprotein).

24. The method according to any of claims 18 to 23, wherein
20 the method combines assay of expression, increase, or decrease or the like of all or a part of the cell proliferation marker, Ki-67 protein.

25. A method that tests drug sensitivity of a cancer cell
25 using the method according to claim 23.

26. A kit and a reagent for assay or diagnosis, for use in the method according to any of claim 18 to 25.